

## **CLAIMS**

1. An optical waveguide device comprising at least one optical input for receiving an optical signal; at least one optical output for the output of an optical signal; and an optical waveguide connected between said input and said output; wherein said optical  
5 waveguide comprises a strip loaded waveguide, and the device further comprises an additional material positioned adjacent at least a portion of the waveguide, the material having a higher refractive index than the waveguide such that an optical signal guided by the waveguide will at least partially couple into the material.
2. A device as claimed in claim 1, wherein said additional material has optical  
10 properties that can be controllably altered.
3. A device as claimed in claim 1, wherein said material is an electro-optic material.
4. A device as claimed in claim 1, wherein said material is selected from the group consisting of a polymer or other oligomer, dendrimer, liquid crystal or  
15 supramolecular system.
5. A device as claimed in claim 1, wherein said waveguide is formed from silica on silicon.
6. A device as claimed in claim 1, wherein at least a portion of said material is adiabatically tapered such that at least one of the optical-signal coupling from the wave-  
20 guide to the material, or from the material to the wave-guide, is substantially adiabatic.
7. A device as claimed in claim 1, further comprising a cladding layer, said cladding layer being arranged to substantially overlay the additional material.
8. An optical unit for the optical processing of an optical signal, the unit comprising at least one optical input for receiving an optical signal; at least one optical  
25 output for the output of an optical signal; and an optical waveguide connected between said input and said output; wherein said optical waveguide comprises a strip loaded waveguide, and the device further comprises an additional material positioned adjacent at least a portion of the waveguide, the material having a higher refractive index than the waveguide such that an optical signal guided by the waveguide will at least partially  
30 couple into the material, the unit further comprising control means arranged to alter the optical properties of said material.

9. A unit as claimed in claim 8, the unit being arranged to perform the functions of at least one of a tuneable filter, a modulator, a demodulator, a switch, a polarisation mode dispersion compensator or a chromatic dispersion compensator.

10. An optical unit as claimed in claim 8, wherein said waveguide is arranged as at least one of a Mach-Zehnder, a ring resonator, or an arrayed waveguide grating.

11. An optical unit as claimed in claim 8, the unit comprising two of said optical waveguide devices, the unit further comprising splitter means arranged to split an optical signal input to said unit so as to send a portion of the input signal to a respective input of each waveguide device, the splitting means being arranged such that the signals received at the respective optical waveguides have an electrical field parallel to the respective strip waveguides.

12. A unit as claimed in claim 11 wherein said splitting means comprises a walk-off plate and a half waveplate.

13. A unit as claimed in claim 8, the unit further comprising a light source arranged to provide an optical input to said device.

14. A node in a communications network comprising a receiver for receiving a signal, a transmitter for the onward transmission of a signal, at least one of the received signal and the transmitted signal being an optical signal, and

an optical waveguide device comprising at least one optical input for receiving an optical signal; at least one optical output for the output of an optical signal; and an optical waveguide connected between said input and said output; wherein said optical waveguide comprises a strip loaded waveguide, and the device further comprises an additional material positioned adjacent at least a portion of the waveguide, the material having a higher refractive index than the waveguide such that an optical signal guided by the waveguide will at least partially couple into the material.

15. A communications system comprising a plurality of the nodes as claimed in claim 14.

16. A method of using an optical waveguide device, the optical waveguide device comprising at least one optical input for receiving an optical signal; at least one optical output for the output of an optical signal; and an optical waveguide connected between said input and said output; wherein said optical waveguide comprises a strip loaded

waveguide, and the device further comprises an additional material positioned adjacent at least a portion of the waveguide, the material having a higher refractive index than the waveguide such that an optical signal guided by the waveguide will at least partially couple into the material, the method comprising the steps of:

5 providing an optical signal to the input of said device;

the signal being transmitted along said optical waveguide, and coupling in and out of said additional material; and

the optical signal being output at the device output.

10 17. A method of manufacturing an optical waveguide device, the method comprising the steps of:

forming an optical input for receiving an optical signal;

forming an optical output for the output of an optical signal;

forming an optical waveguide comprising a strip-loaded waveguide connected between said input and said output; and

15 positioning a material adjacent at least a portion of said waveguide such that an optical signal transmitted along the waveguide will couple in and out of said additional material.